

Claims

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A method for extracting gluten from flour comprising the following steps:

5 (a) mixing milled flour with water and an agent for breaking chemical bonds between starch molecules and protein molecules,

(b) maturing the flour and water mixture in a maturation tank,

(c) combining the flour and water mixture into masses of dough consisting mostly of gluten,

10 (d) presenting the masses of dough to at least one rinser having a screen for retaining the masses of dough as starch is rinsed away from the masses composed mostly of gluten,

(e) feeding the rinsed masses composed mostly of gluten produced in step (d) through a comminuting machine which forces the dough through a channel wherein the dough alternately encounters at least one set of cutting blades and at least one perforated plate to produce smaller masses composed mostly of gluten,

15 (f) presenting the smaller masses composed mostly of gluten produced in step (e) to at least one rinser having a screen for retaining the smaller masses composed mostly of gluten as a substantial portion of the remaining starch is rinsed away from the smaller masses,

20 (g) drying the rinsed smaller masses produced in step (f) to produce a dry product consisting mostly of gluten protein.

2. The method of claim 1, further comprising the following steps:

a first additional step wherein the product of step (f) is allowed to recombine into larger recombined masses, and wherein steps (e) and (f) are performed again on the recombined masses from the first additional step.

3. The method of claim 1, wherein:

step (e) is replaced by the following steps:

(i) a first emulsification step where the masses from step (d) are fed through a first comminuting machine in batches to produce emulsified gluten masses, (ii) rinsing the emulsified gluten masses from step (i) and, (iii) feeding the rinsed emulsified gluten masses from step (ii) through a second emulsification step where the rinsed emulsified gluten masses are further emulsified.

4. A method for separating gluten from grain flour to produce a protein isolate, comprising the following steps:

(a) mixing grain flour with water and a protein starch bond breaking agent to produce masses of dough,

(b) agglomerating the masses of dough by moving the masses of dough of step (a) through an agglomeration tank wherein a portion of the starch in the dough is washed away from the masses to produce masses composed mostly of gluten,

(c) rinsing the masses composed mostly of gluten of step (b) with water over a screen to produced rinsed gluten masses,

(d) emulsifying the rinsed gluten masses of step (c) by passing the rinsed gluten masses through a throat and past rotating blades to produce chopped gluten masses and then drawing the chopped gluten masses through a perforated plate proximate to the rotating blades to produce relatively small chopped gluten masses,

(e) rinsing the relatively small chopped gluten masses from step (d) to remove a portion of the remaining starch such that the resulting gluten masses are at least 90% gluten thereby providing masses of protein isolate.

5. The method of claim 4 wherein,

the emulsification step of step (d) includes the following steps

(i) a batch emulsification step in which batches of rinsed gluten masses from step (c) are passed through a throat, past rotating blades and through a perforated plate, and

(ii) a continuous emulsification step in which rinsed emulsified gluten masses from step (i) are passed through a throat, past rotating blades and through a perforated plate in a continuous manner.

6. The method of claim 4 wherein,

the emulsification step of step (d) includes the following steps

(i) a batch emulsification step in which batches of rinsed gluten masses from step (c) are passed through a throat, past rotating blades and through a perforated plate at least two times, and

(ii) a continuous emulsification step in which rinsed emulsified gluten masses from step (i) are passed through a throat, past rotating blades and through a perforated plate in a continuous manner

7. The method of claim 4 wherein,

the emulsification step of step (d) includes the following steps

(i) a batch emulsification step in which rinsed gluten masses from step (c) are passed through a throat, past rotating blades and through a perforated plate in a repetitious manner,

(ii) a surge storage step where emulsified gluten masses from step (i) are stored in a surge storage tank,

(iii) a rinsing step in which emulsified gluten masses are drawn from the surge storage tank of step (ii) and rinsed with water,

(iv) a continuous emulsification step in which rinsed emulsified gluten masses from step (iii) are passed through a throat, past rotating blades and through a perforated plate in a once through, continuous manner, and,

(v) a washing step where the gluten masses from step (iv) are rinsed of substantially most of their remaining starch.

8. The method of claim 4 wherein,

the emulsification step of step (d) includes the following steps

(i) a batch emulsification step in which rinsed gluten masses from step (c)

are passed through a throat, past rotating blades and through a perforated plate in a
repetitious manner,

(ii) a surge storage step where emulsified gluten masses from step (i) are
stored in a surge storage tank,

(iii) a screen rinse step in which emulsified gluten masses are drawn from
the surge storage tank of step (ii) and passed over a screen while rinsed with water,

(iv) a continuous emulsification step in which rinsed emulsified gluten
masses from step (iii) are passed through a throat, past rotating blades and through
a perforated plate in a once through, continuous manner, and,

(v) washing step where the gluten masses from step (iv) are rinsed of
substantially most of their remaining starch.

9. A method for separating gluten from grain flour to produce a protein isolate,
comprising the following steps:

(a) mixing grain flower with water and a protein starch bond breaking
enzyme to produce masses of dough,

(b) agglomerating the masses of dough by moving the masses of dough of step (a) through an agglomeration tank wherein a portion of the starch in the dough is washed away from the masses to produce masses composed mostly of gluten,

(c) rinsing the masses composed mostly of gluten of step (b) with water over a screen to produced rinsed gluten masses,

(d) washing the masses composed mostly of gluten in a rotary drum washer,

(e) emulsifying the whshed gluten masses of step (d) by

(i) emulsifying the rinsed gluten masses in a batch emulsification step in which rinsed gluten masses from step (d) are passed through a throat, past rotating blades and through a perforated plate,

(ii) storing the gluten masses from step (i) in a surge storage tank,

(iii) rinsing the gluten masses from the surge storage tank,

(iv) providing a substantially continuous supply of gluten masses from the surge storage tank to a continuous emulsification step in which rinsed emulsified gluten masses from step (iii) are passed through a throat, past rotating blades and through a perforated plate in a once through, continuous manner, and,

(e) washing the relatively small chopped gluten masses from step (d) (iv) to remove a portion of the remaining starch such that the resulting gluten masses are at least 90% gluten thereby providing masses of protein isolate.

10. The method of claim 9 wherein,

batch emulsification step (e) (i) is repeated more than once with each batch of masses to increase the resulting protein concentration.